

WHAT IS CLAIMED IS:

- 1           1.     A method for building a list of parameters to include with a command,  
2 comprising:  
3           receiving a plurality of input parameters;  
4           determining whether a number of the input parameters exceeds a threshold  
5 number of parameters that are capable of being included in the command;  
6           merging content of multiple input parameters into at least one output  
7 parameter if the number of input parameters exceeds the threshold number, wherein  
8 the content of the input parameters is included in a number of output parameters that  
9 does not exceed the threshold; and  
10          including the output parameters with the command.
- 1           2.     The method of claim 1, wherein each input parameter comprises at  
2 least one extent that defines a range of tracks between a beginning track and end  
3 track, wherein the beginning track of a given extent follows the tracks in all previous  
4 extents, and wherein each output parameter includes at least one input extent and  
5 wherein at least one output parameter includes the tracks from multiple input extents  
6 if the number of input extents exceeds the threshold number.
- 1           3.     The method of claim 2, wherein there are  $n$  input extents, the threshold  
2 number of extents is  $m$ , and  $n$  is greater than  $m$ , further comprising:  
3           placing each of a plurality of  $(m - k)$  input extents into  $(m - k)$  separate output  
4 extents, wherein  $k$  is an integer less than  $n$  minus  $m$ ; and  
5           arranging the remaining  $(m - k + 1)$  to  $n$  input extents into at least one  
6 of  $k$  output extents.
- 1           4.     The method of claim 3, further comprising determining whether  
2 control data is stored in tracks before the  $(m - k + 1)$  input extent, wherein arranging  
3 the remaining  $(m - k + 1)$  to  $n$  input extents into at least one of  $k$  output extents

4 comprises arranging the remaining input extents into one output extent if the control  
5 data is stored in tracks before the  $(m - k + 1)$  input extent.

1        5.        The method of claim 3, further comprising:  
2                determining whether control data is stored in tracks between the  $(m - k + 1)$   
3        and  $n$  input extents;  
4                arranging the extents from the  $(m - k + 1)$  input extent to the input extent  
5        immediately preceding the track storing the control data into a first output extent if  
6        the control data is stored in tracks between the  $(m - k + 1)$  and  $n$  input extents; and  
7                arranging the extents from the input extent following the control data to the  $n$   
8        input extent into a second output extent if the control data is stored in tracks between  
9        the  $(m - k + 1)$  and  $n$  input extents.

1        6.        The method of claim 2, wherein merging multiple input tracks into one  
2        output extent further comprises defining the output extent as having a beginning track  
3        equal to the beginning track of a first of the multiple input tracks to merge and an  
4        ending track equal to the ending track of the a last of the multiple input tracks to  
5        merge.

1        7.        The method of claim 2, further comprising:  
2                determining whether control data is stored in tracks between the tracks of the  
3        input extents; and  
4                arranging the tracks in the input extents into the output extents in a manner  
5        that avoids including any control data tracks in the tracks defined in the output  
6        extents.

1        8.        The method of claim 2, wherein the command is a copy command to  
2        copy the track ranges defined in the output extents included as parameters to target

3 tracks, wherein the target tracks are capable of storing a duplicate copy of the data in  
4 the track ranges defined in the output extents.

1 9. The method of claim 8, wherein the copy command is a point-in-time  
2 copy command that indicates in data structures that the tracks in the output extents  
3 included as parameters are subject to a point-in-time copy relationship.

1 10. The method of claim 9, wherein the data in the tracks in one output  
2 extent subject to the point-in-time copy relationship are only copied to the target  
3 tracks if the data in one track in the output extents is modified.

1 11. A system for building a list of parameters to include with a command,  
2 comprising:  
3 a processor;  
4 means for receiving a plurality of input parameters;  
5 means for determining whether a number of the input parameters exceeds a  
6 threshold number of parameters that are capable of being included in the command;  
7 and  
8 means for merging content of multiple input parameters into at least one  
9 output parameter if the number of input parameters exceeds the threshold number,  
10 wherein the content of the input parameters is included in a number of output  
11 parameters that does not exceed the threshold; and  
12 means for including the output parameters with the command.

1 12. The system of claim 1, further comprising a storage device wherein  
2 each input parameter comprises at least one extent that defines a range of tracks in the  
3 storage device between a beginning track and end track on the storage device, wherein  
4 the beginning track of a given extent follows the tracks in all previous extents, and  
5 wherein each output parameter includes at least one input extent and wherein at least

6 one output parameter includes the tracks from multiple input extents if the number of  
7 input extents exceeds the threshold number.

1 13. The system of claim 12, wherein the processor comprises a first  
2 processor, further comprising:

3 a second processor in communication with the first processor and having  
4 access to the storage device;

5 means, implemented in the first processor to communicate the command  
6 including the output extent to the second processor; and

7 means, implemented in the second processor, for performing an operation  
8 defined by the command with respect to the output extents.

1 14. The system of claim 12, wherein there are  $n$  input extents, the  
2 threshold number of extents is  $m$ , and  $n$  is greater than  $m$ , further comprising:

3 means for placing each of a plurality of  $(m - k)$  input extents into  $(m - k)$   
4 separate output extents, wherein  $k$  is an integer less than  $n$  minus  $m$ ; and

5 means for arranging the remaining  $(m - k + 1)$  to  $n$  input extents into at least  
6 one of  $k$  output extents.

1 15. The system of claim 14, further comprising means for determining  
2 whether control data is stored in tracks before the  $(m - k + 1)$  input extent, wherein  
3 arranging the remaining  $(m - k + 1)$  to  $n$  input extents into at least one of  $k$  output  
4 extents comprises arranging the remaining input extents into one output extent if the  
5 control data is stored in tracks before the  $(m - k + 1)$  input extent.

1 16. The system of claim 14, further comprising:

2 means for determining whether control data is stored in tracks between the  
3  $(m - k + 1)$  and  $n$  input extents;

4 means for arranging the extents from the  $(m - k + 1)$  input extent to the input  
5 extent immediately preceding the track storing the control data into a first output  
6 extent if the control data is stored in tracks between the  $(m - k + 1)$  and  $n$  input  
7 extents; and  
8 means for arranging the extents from the input extent following the control  
9 data to the  $n$  input extent into a second output extent if the control data is stored in  
10 tracks between the  $(m - k + 1)$  and  $n$  input extents.

1 17. The system of claim 12, wherein merging multiple input tracks into  
2 one output extent further comprises means for defining the output extent as having a  
3 beginning track equal to the beginning track of a first of the multiple input tracks to  
4 merge and an ending track equal to the ending track of the a last of the multiple input  
5 tracks to merge.

1 18. The system of claim 12, further comprising:  
2 means for determining whether control data is stored in tracks between the  
3 tracks of the input extents; and  
4 means for arranging the tracks in the input extents into the output extents in a  
5 manner that avoids including any control data tracks in the tracks defined in the  
6 output extents.

1 19. The system of claim 12, wherein the command is a copy command to  
2 copy the track ranges defined in the output extents included as parameters to target  
3 tracks, wherein the target tracks are capable of storing a duplicate copy of the data in  
4 the track ranges defined in the output extents.

1 20. The system of claim 8, wherein the copy command is a point-in-time  
2 copy command that indicates in data structures that the tracks in the output extents  
3 included as parameters are subject to a point-in-time copy relationship.

24. The article of manufacture of claim 23, wherein each input parameter comprises at least one extent that defines a range of tracks between a beginning track and end track, wherein the beginning track of a given extent follows the tracks in all

4 previous extents, and wherein each output parameter includes at least one input extent  
5 and wherein at least one output parameter includes the tracks from multiple input  
6 extents if the number of input extents exceeds the threshold number.

1        25.    The article of manufacture of claim 24, wherein there are  $n$  input  
2 extents, the threshold number of extents is  $m$ , and  $n$  is greater than  $m$ , further  
3 comprising:  
4        placing each of a plurality of  $(m - k)$  input extents into  $(m - k)$  separate output  
5 extents, wherein  $k$  is an integer less than  $n$  minus  $m$ ; and  
6        arranging the remaining  $(m - k + 1)$  to  $n$  input extents into at least one  
7 of  $k$  output extents.

1        26.    The article of manufacture of claim 25, further comprising determining  
2 whether control data is stored in tracks before the  $(m - k + 1)$  input extent, wherein  
3 arranging the remaining  $(m - k + 1)$  to  $n$  input extents into at least one of  $k$  output  
4 extents comprises arranging the remaining input extents into one output extent if the  
5 control data is stored in tracks before the  $(m - k + 1)$  input extent.

1        27.    The article of manufacture of claim 25, further comprising:  
2        determining whether control data is stored in tracks between the  $(m - k + 1)$   
3 and  $n$  input extents;  
4        arranging the extents from the  $(m - k + 1)$  input extent to the input extent  
5 immediately preceding the track storing the control data into a first output extent if  
6 the control data is stored in tracks between the  $(m - k + 1)$  and  $n$  input extents; and  
7        arranging the extents from the input extent following the control data to the  $n$   
8 input extent into a second output extent if the control data is stored in tracks between  
9 the  $(m - k + 1)$  and  $n$  input extents.

32. The article of manufacture of claim 31, wherein the data in the tracks in one output extent subject to the point-in-time copy relationship are only copied to the target tracks if the data in one track in the output extents is modified.